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*Review*

# Entrepreneurial Education at Universities: A Bibliometric Analysis

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**Abstract:** This study aims to identify the primary topics and present dynamics in the field of entrepreneurship education at universities and to make recommendations for future research directions. We conduct a bibliometric analysis on a selection of 447 studies from the Web of Science database to determine the extent of research on entrepreneurship education at universities between 2004 and 2022. In this study, researchers identify the most influential articles and writers based on their citations, publications, and geographical location. Additionally, they assess existing themes, identify bottlenecks to growth in the literature, and recommend future study options. While research on entrepreneurship education at universities happens globally, there is a dearth of collaboration across national borders, particularly between writers from developed and developing countries. Most of the research on entrepreneurship education at universities focuses on a quantitative approach in the analysis of entrepreneurship. Lastly, we conclude by proposing possible avenues for future research.

**Keywords:** entrepreneurship education; bibliometric analysis; higher education; entrepreneurial self-efficacy; entrepreneurial intention



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## 1. Introduction

The current world is facing challenges after the COVID-19 pandemic faced by all around the world; in this situation the survival of economies is mainly based on successful entrepreneurs. Professor Howard Stevenson defined entrepreneurship thusly: "Entrepreneurship is the pursuit of opportunity without regard to resources currently controlled" (Matei and Voica 2013, p. 3). This study further analyzed the behavior of the entrepreneur in two different scenarios, including here the promoter and the trustee. The promoter feels capable of making the most of the opportunities presented, regardless of the means at hand, while the trustee believes in his or her own ability to make the most of opportunities, regardless of the means at hand.

Essential characteristics of entrepreneurs include the ability to recognize opportunity where others see chaos, contradiction, and confusion; the willingness to take calculated risks with one's time, equity, or career; the ability to form an effective venture team; the creative skill to marshal needed resources; the fundamental skill of building a solid business plan; and, finally, the vision to recognize opportunity where others see chaos, contradiction, and confusion (Kuratko 2016).

In order to cultivate entrepreneurs in the world it is important to enhance entrepreneurship education. One of the most influential contemporary management theorists, Peter Drucker, has said "The entrepreneurial mystique? It's not magic, it's not mysterious, and is has nothing to do with the genes. It's a discipline. And, like any discipline, it can be learned" (Drucker 1985). Accordingly, the behaviors needed by entrepreneurs are mainly cultivated through entrepreneurship education. Entrepreneurship education is defined as 'any pedagogical process of education for entrepreneurial attitudes and skills' (Fayolle et al.

2006, p. 702; Ndou et al. 2018). Numerous studies demonstrate the benefits of entrepreneurship education and the ways in which it can strengthen entrepreneurial motivations (Kariv et al. 2018; Breznitz and Zhang 2021; Ndou et al. 2019). Accordingly, entrepreneurship education plays a crucial role in developing successful entrepreneurs (Ndou 2021; Panait et al. 2022).

In this context, universities play a significant role in developing curriculums and curricula related to entrepreneurship education (Coşkun et al. 2022; Apostu et al. 2022; Fayolle et al. 2006; Avram and Hysa 2022). Institutional support for student businesses can take many forms, including business plan contests, accelerator and incubator programs, intellectual property (IP) services, and entrepreneurship education programs (Lüthje and Franke 2003; Foote and Hysa 2022).

In addition, it is important to boost the relevance of entrepreneurship education in higher education, with a focus on the value of hands-on experience, and encourage the growth of programs that provide both theoretical and practical training in the field (Breznitz and Zhang 2021; Hysa 2014). There are many studies that have investigated entrepreneurial education at universities (Lüthje and Franke 2003; Kariv et al. 2018; Popescu 2019; Breznitz and Zhang 2021).

There are a few studies that have conducted literature reviews on entrepreneurial education, but no study has comprehensively analyzed literature related to entrepreneurial education at universities in the current context (Lüthje and Franke 2003; Kuratko 2017) Nevertheless, according to the researchers' knowledge, there is no study that has conducted a bibliometric analysis in entrepreneurial education at the universities. Accordingly, this paper bridges the gap by conducting comprehensive bibliometric analysis on entrepreneurship education at universities in the period of 1994–2022 and explores the research gaps in this research field.

The following research questions were explored in the paper through the use of bibliometric analysis and content analysis techniques.

RQ 1: What is the trend of publications related to entrepreneurship education at universities?
RQ 2: Who are the most cited pioneer authors in the subject of entrepreneurship education at universities?
RQ 3: Which journals dominate entrepreneurship education at universities?
RQ 4: What is the total number of articles based on countries, and international collaboration in the subject of entrepreneurship education at universities?
RQ 5: Which publications and papers on entrepreneurship education at universities have the most significant citation impact?
RQ 6: What are the relevant author keywords related to the entrepreneurship education at universities?
RQ 7: What are the future research recommendations related to entrepreneurship education at universities?

It is critical to delve into these research questions in order to identify the state of knowledge, trends of research and research requirements in the context of entrepreneurial education at universities. Based on the aforementioned, the current research employs a bibliometric-based evaluation methodology to assess the quality of previous works on the topic of entrepreneurial education at universities.

The following contributions will be demonstrated: First, we will provide a comprehensive overview of the research contribution of scientific journals, authors, and countries; secondly, we will take a closer look at the most-cited works and most-productive authors; third, we qualitatively analyze the highly cited articles in the domain of entrepreneurship education at universities and, finally, we will examine the research agenda's top priorities and any potential structural gaps.

This paper is organized as follows: introduction literature review; empirical results and their discussion; methodology; conclusion; and policy implications.

## 2. Materials and Methods

### *2.1. Explanations*

In this paper, a bibliometric analysis was used to provide an all-encompassing picture of the current state of scientific production and evaluate the quality of previous studies, providing a wealth of information on a specific topic. Bibliometric analysis has grown significantly, starting with 1998 till 2017 and even after, at an even higher rate (see White and McCain 1998; van Eck and Waltman 2017). As described by statisticians and mathematicians (Garfield 1955), this approach utilizes a wide range of mathematical tools and statistical methodologies to examine and survey published works such as articles and books. Statistical methods shed light on scientific research explanations and disciplinary patterns (De Bakker et al. 2005; Bouyssou and Marchant 2011). Bibliometric analyses tell researchers about the history of a field, illuminate its current state, and suggest new research directions (Durieux and Gevenois 2010; Bilal et al. 2022).

This study of bibliometric analysis concentrated on the field of entrepreneurship education in university research. Our review only included empirical and review articles. We also did not include studies that were not written in English in our analysis. The analysis did not include other forms of literature, such as books, book chapters, or conference proceedings. In fact, this study method of data collection and data analysis is depicted in Figure 1. There are five stages in a typical bibliometric analysis: research design, data gathering, analysis, visualization, and interpretation (Zupic and Čater 2014).

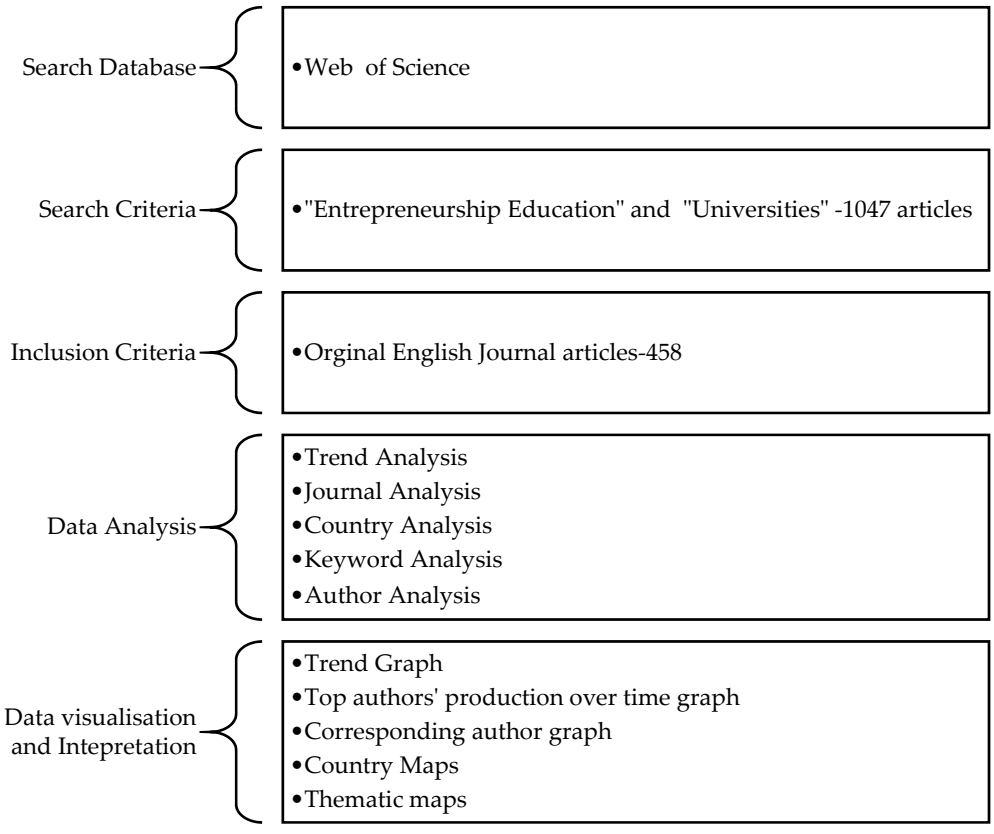


**Figure 1.** Paper Methodology. Adapted from Zupic and Čater (2014).

### *2.2. Search Database*

When it comes to scientific literature, the Web of Science is unrivalled as the largest and most comprehensive database in existence. More than 11,000 peer-reviewed, high-impact academic journals covering the life and physical sciences, technology, medicine, and other related disciplines are included. The Web of Science database was used for the research in this article.

### 2.3. Search Criteria

This study used "entrepreneurship education" and "universities" as search terms in the Web of Science database. Initially, 1047 documents were extracted.

### 2.4. Inclusion Criteria

Next, non-English language articles and non-journal publications (589) were removed in order to obtain a better review. Finally, we analysed 458 English language journal publications.

Web of Science found 1047 publications covering entrepreneurship education at universities; of these, 458 (43.74%) were original research articles, 558 (53.30%) were conference proceedings, 13 (1.24%) were review articles, and 40 (3.82%) were other types of publications like book reviews, meeting abstracts, etc., while only one paper accepted to be published in 2023 was removed. Approximately 1016 papers (97%) were published in English. Finally, this study selected 458 articles for further analysis.

### 2.5. Data Analysis

In this paper, we used the Biblioshiny program to examine and depict the current state and future directions of entrepreneurship education in university research. Massimo Aria created the Biblioshiny software with the Shiny package written in the R programming language (Aria and Cuccurullo 2017).

Next, this study used bibliometric analysis techniques to explore the trend of publications, source analysis, country analysis, author analysis and keyword analysis. The author' journal productivity is analyzed using h-index, g-index, m-index and total citations. The h-index is a non-dimensional measure of an author's scholarly influence based on the frequency with which their own work has been cited by other scholars in the field. According to the definition of the h-index provided by Bornmann and Daniel (2007) and Choudhri et al. (2015), an h-index author has published at least h articles that have been cited at least h times. Similar to the h-index, the m-quotient (or m-index) is calculated by dividing an author's h-index by the number of years since their first publication. The g-index is the middle value of the number of citations (or the frequency with which an article has been referenced) for the top 'g' articles.

### 2.6. Data Visualisation and Interpretation

Finally, data is visualized using tables and figures including trend graphs, top authors' production over the graph, corresponding author country figure, country map, and thematic map. Next, these tables and figures are interpreted to derive meaningful conclusions.

## 3. Results

This section explains trend analysis, author analysis, source analysis, country analysis, and keyword analysis.

### 3.1. Trend Analysis

This study used time series analysis and stages of development analysis to explain the evolution of trends in entrepreneurship education at universities. A time series analysis allows for a year-by-year look at the evolution of development by the overall situation, and research trends are reflected in the yearly distribution of documents. Next, the articles can be broken down into discrete phases, and the features of the overall trend are displayed through the description of various stages of development. For the analysis of the articles, 10-year periods were used (i.e., well-defined decades). Figure 2 illustrates three time periods, including 1994–2003, 2004–2013 and 2014–2022.

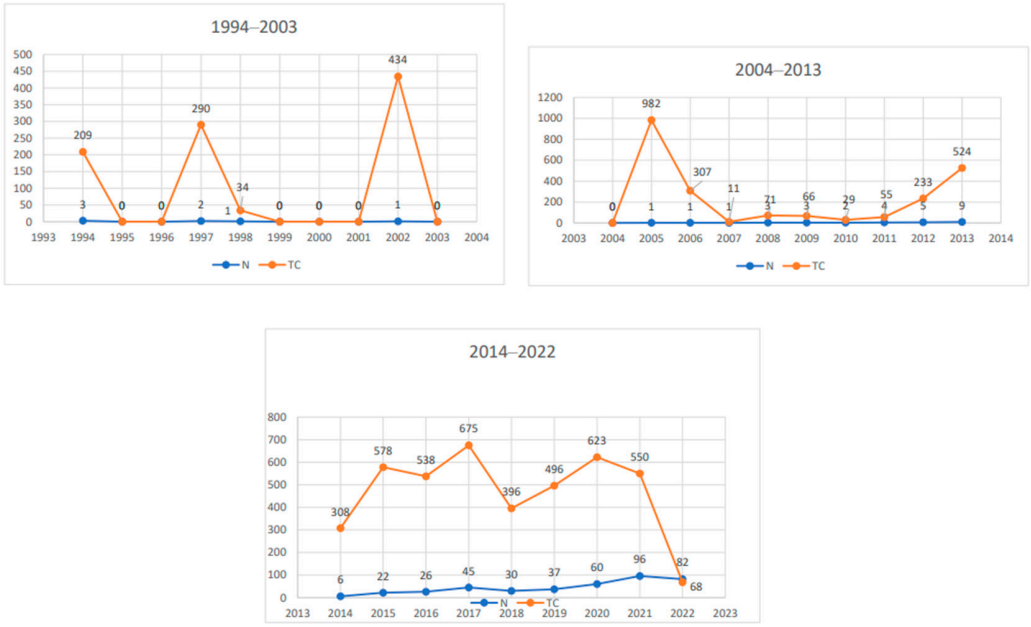


**Figure 2.** Trend Analysis. Source: Constructed by the authors.

In the period 1994–2013, a maximum of 5 publications per year were recorded in most years, and in some years there was not even one publication (according to the blue line in Figure 2). However, this small number of published articles have each received more than 200 citations, meaning that they can be considered seminal papers. The first paper in the Web of Science database that was published, "Experiments in Entrepreneurship Education—Successes and Failures", by Gartner and Vesper, received 143 citations (Gartner and Vesper 1994). "In pursuit of a new 'enterprise' and 'entrepreneurship' paradigm for learning: creative destruction, new values, new ways of doing things and new combinations of knowledge" by Gibbs (1993) was the highest cited paper in this period.

The next period, 2004 to 2013, illustrates steady growth in the number of publications. It was observed that all the years except 2004 saw the publishing of at least one article, and all articles received at least 11 citations. The highest number of citations was received by an article published in 2005 titled "The emergence of entrepreneurship education: Development, trends, and challenges", which was authored by Kuratko (2017).

The last period, 2014–2022, shown in Figure 2, illustrated an upward growth in the number of publications. In 2021, the highest number of publications was recorded (96), while in all other years, at least 20 papers were published (except for 2014). The highest number of citations received in the year 2017 was 675 citations for 45 papers. In this period the highest number of citations was received for "The Impact of Entrepreneurship Education: A Study of Iranian Students' Entrepreneurial Intentions and Opportunity Identification", which was authored by Karimi, Biemans and Mulder, which received 176 citations (Karimi et al. 2016). The newest paper in the Web of Science database was "Model Construction of College Students' Entrepreneurial Ability Cultivation in Mental Health Education Environment", authored by Huang (2022).

### *3.2. Author Analysis*

There were a total of 1096 authors in the study, with 987 contributing one paper, 28 contributing two or more, and 12 contributing four or more. Table 1 shows that Kuratko DF, Gibb A, Gartner WB, Vesper KH, Rasmussen EA and Solheim R are the highest-cited authors who received more than 300 citations. Secundo G, an Italian scholar, has published the highest number of university-education articles on entrepreneurship education. Secundo G has an h-index of 5, a g-index of 7, and a total citation count of 111. Secundo G is well-respected in the study of entrepreneurship education due to the high quality of the

many publications she has authored and published on the topic. Secundo G began publishing papers in 2016, as shown in Figure 3 (the size of the circle in the Figure represents the number of documents, and the shade of the colour represents the number of citations), with the most published documents and the highest frequency of average citations per item occurring in 2021.

**Table 1.** Most relevant authors.

| Element | h_index | g_index | m_index | TC | NP | PY_start |
|---|---|---|---|---|---|---|
| Kuratko DF | 1 | 1 | 0.056 | 982 | 1 | 2005 |
| Gibb A | 1 | 1 | 0.048 | 434 | 1 | 2002 |
| Gartner WB | 3 | 3 | 0.103 | 397 | 3 | 1994 |
| Vesper KH | 2 | 2 | 0.069 | 369 | 2 | 1994 |
| Rasmussen EA | 1 | 1 | 0.059 | 307 | 1 | 2006 |
| Sorheim R | 1 | 1 | 0.059 | 307 | 1 | 2006 |
| Sanchez JC | 1 | 1 | 0.1 | 241 | 1 | 2013 |
| Cloodt M | 1 | 1 | 0.111 | 218 | 1 | 2014 |
| Duysters G | 1 | 1 | 0.111 | 218 | 1 | 2014 |
| Zhang Y | 1 | 1 | 0.111 | 218 | 1 | 2014 |

Source: Constructed based on Biblioshiny Software.

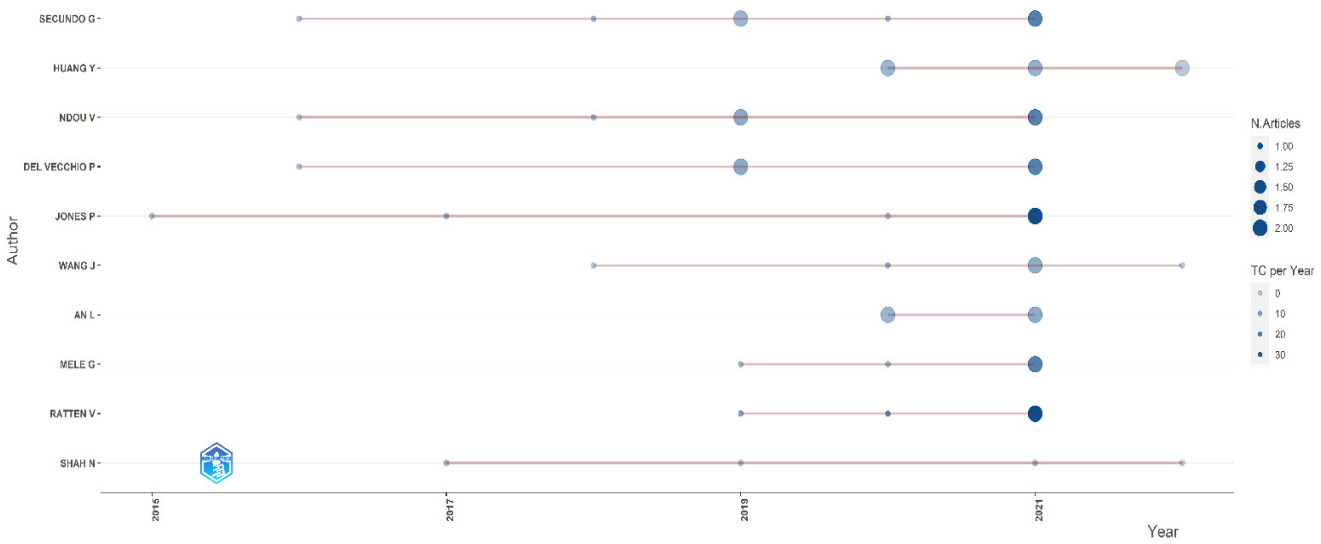


**Figure 3.** Top authors' production over time. Source: constructed based on Biblioshiny software.

As an illustration, G. Secundo et al. (2021) article in the Technol Forecast Soc Change journal, titled "Threat or opportunity? A case study of the digital-enabled redesign of entrepreneurship education in the COVID-19 emergency", was cited 37 times (Secundo et al. 2021). The research employs a mixed-method approach to enumerate the accomplishments of the University of Salento's Contamination Lab (CLab@Salento), an entrepreneurship education program focusing on innovative and technology-based entrepreneurship. Through digital technology, this study demonstrates a novel method for entrepreneurial education through storytelling, pitching, and business planning and development.

Kuratko was the highest cited author, and received 982 citations for one paper (see more in Table 1). This article discusses contemporary issues and developments in the field of entrepreneurship education. Accordingly, Ndou had the second highest number of publications and the h index and g index 5 and 6, respectively. She had her first publication in the year 2017 and the most recent publication in 2021. The highest cited article was

co-authored with Secundo G. in 2021, which is discussed above. Jones P had the third highest number of publications, and the h index and g index was 5, respectively. His first publication was in 2016 and his most recent was in 2021, and he published articles related to entrepreneurship education. His highest cited article was titled "COVID-19 and entrepreneurship education: Implications for advancing research and practice", published and co-authored by Ratten and Jones in 2021.

### 3.3. Source Analysis

There was a total of 173 sources as part of the study, with eight journals considered core journals producing 148 papers, 38 journals (the middle zone) producing 148 papers and zone three, which had 128 journals (a selection of most relevant journals is presented in Table 2). Table 3 shows that *Entrepreneurship Theory and Practice*, *The Journal of Small Business Management*, *Education and Training*, *The International Journal of Management Reviews* and *The Journal of Business Venturing* are the highest cited journals which received more than 4000 citations. *Entrepreneurship Theory and Practice*, a Q1 journal, has published the highest cited articles on entrepreneurship education at universities. This journal has an h-index of 1, a g-index of 1, and a total citation count of 982.

**Table 2.** Most relevant journals.

| Element | h_index | g_index | m_index | TC | NP |
|---|---|---|---|---|---|
| Education and Training | 14 | 21 | 1.75 | 478 | 28 |
| Frontiers in Psychology | 6 | 9 | 2 | 103 | 19 |
| International Journal of Management Education | 11 | 15 | 1.375 | 326 | 15 |
| Sustainability | 6 | 12 | 1.2 | 156 | 13 |
| Industry and Higher Education | 4 | 6 | 0.5 | 50 | 11 |
| International Journal of Entrepreneurial Behavior & Research | 7 | 10 | 0.538 | 127 | 10 |
| Studies in Higher Education | 7 | 9 | 0.875 | 99 | 10 |
| Journal of Small Business Management | 7 | 8 | 0.7 | 844 | 8 |
| Journal of Technology Transfer | 7 | 8 | 0.778 | 263 | 8 |
| Entrepreneurship and Regional Development | 6 | 6 | 0.545 | 252 | 6 |

**Table 3.** Most Cited Sources.

| Journal | h_index | g_index | m_index | TC | NP |
|---|---|---|---|---|---|
| Entrepreneurship Theory and Practice | 1 | 1 | 0.056 | 982 | 1 |
| Journal of Small Business Management | 7 | 8 | 0.7 | 844 | 8 |
| Education and Training | 14 | 21 | 1.75 | 478 | 28 |
| International Journal of Management Reviews | 1 | 1 | 0.048 | 434 | 1 |
| Journal of Business Venturing | 3 | 3 | 0.103 | 433 | 3 |
| Technovation | 3 | 3 | 0.12 | 387 | 3 |
| International Journal of Management Education | 11 | 15 | 1.375 | 326 | 15 |
| International Entrepreneurship and Management Journal | 4 | 4 | 0.444 | 287 | 4 |
| Journal of Technology Transfer | 7 | 8 | 0.778 | 263 | 8 |
| Entrepreneurship and Regional Development | 6 | 6 | 0.545 | 252 | 6 |

Source: Constructed based on Biblioshiny Software.

The *Education and Training* journal published the highest number of publications with an h-index and g-index of 14 and 21, respectively, and is well-respected in the study of entrepreneurship education due to the high quality of the many articles published on the topic. This journal began publishing papers in 2015, with the highest frequency of average citations per item occurring in the same year. The highest cited article in this journal is titled "Beyond intentions—what makes a student start a firm?" co-authored by Joensuu-Salo et al. (2015).

### *3.4. Country Analysis*

It is possible that a country's prominence and sway in the study of entrepreneurship education in universities can be gauged by the number of papers published there on a particular topic. Between 1994 and 2022, authors from 78 different nations and regions published their research. Table 4 shows the top ten cited countries. Only China is in Asia; seven countries are in Europe (the United Kingdom, the Netherlands, Italy, Spain, Norway, Germany and Portugal). Two are in the Americas (the United States, Brazil), while China, the USA, the UK, Italy, and Spain are the top five countries in total documents, with the order reflecting decreasing importance.

**Table 4.** Most Cited Countries.

| Country | Total Citations | Total Publications |
|---|---|---|
| USA | 1990 | 121 |
| United Kingdom | 796 | 119 |
| Netherlands | 604 | 30 |
| Italy | 478 | 83 |
| Spain | 465 | 76 |
| Norway | 389 | 15 |
| China | 315 | 321 |
| Germany | 233 | 33 |
| Portugal | 171 | 38 |
| Brazil | 116 | 35 |

Source: Constructed based on Biblioshiny Software.

Table 4 shows that developed regions, like Europe and North America, are where most research papers on entrepreneurship education at universities are published. These findings suggest that these regions are driving the field. A more significant theoretical impact on developing countries could result from studying entrepreneurial education, but academic research focuses primarily on developed countries. There are several factors at play here. Most developing regions receive inadequate investment in entrepreneurial education, making it difficult to support more academic research.

China performs exceptionally well when working with other countries, as shown in Figure 4. At least 14 studies have involved collaboration from many countries. The United States, United Kingdom, Spain and Italy all frequently collaborate, with rates of 7, 10, 7, and 7 times each year, respectively. While China has published on entrepreneurship education at universities more than any other country, most of these studies have been conducted independently. The country has only worked with Malaysia, United Arab Emirates, Nigeria, Pakistan, Saudi Arabia, Kazakhstan, and Bahrain. Figure 5 displays the collaboration statistics of sample countries on land degradation, showing that 85.8% of China's papers are written independently. While countries like the Netherlands, Australia, Pakistan, Croatia, and Uganda are engaged in international collaboration, which is a greater than 70% multiple-country collaboration, the vast majority of nations research on their

own. There are more publications involving only domestic authors than those from other countries.

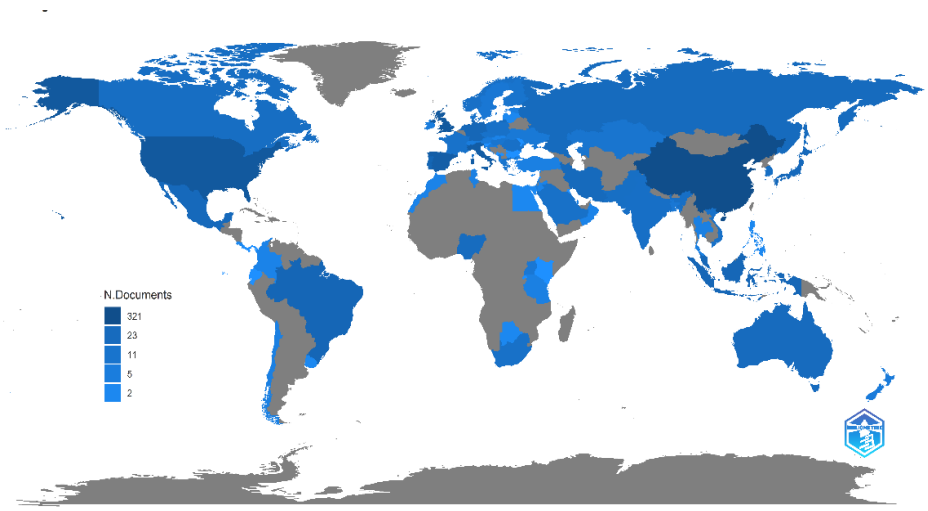


**Figure 4.** Country Scientific Production. Source: Constructed based on Biblioshiny Software.

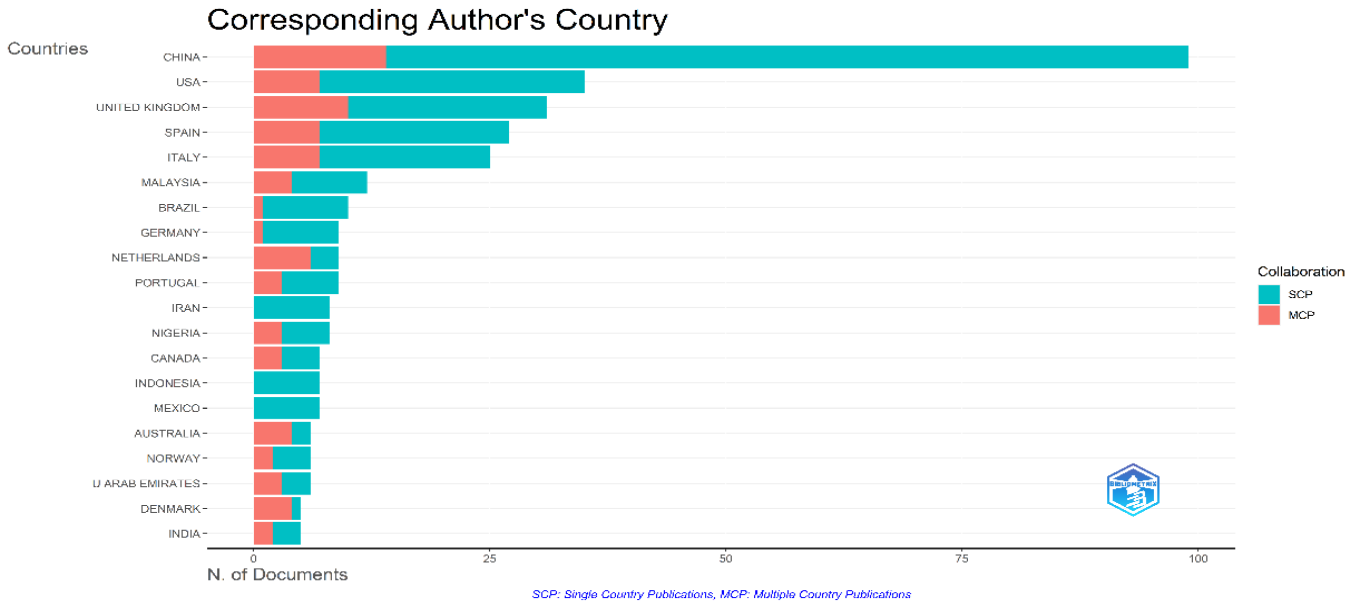


**Figure 5.** Corresponding author's Country. Source: Constructed based on Biblioshiny Software.

### *3.5. Keyword Analysis*

The article's core is summarized and refined at a high level in the keywords (Xie et al. 2020). The highly frequent keywords used in this study, including cluster and multiple correspondence analysis, clearly and intuitively convey the article's concept and writing style in university entrepreneurial education. The software program Biblioshiny does data mining and statistical analysis of the high-frequency keywords of the research publications. Keywords with a word frequency of more than or equal to 10 are chosen and displayed as a word cloud (see Figure 6) using Biblioshiny to do data mining and statistical analysis on the high-frequency keywords of the research papers. Entrepreneurship education, entrepreneurship, entrepreneurial intention and education are the most commonly used keywords in entrepreneurship education at universities, appearing in 26.466%, 15.021%, 7.725% and 7.582%, from the total number of the keywords analysed from the literature review, respectively, accordingly to Figure 6 (See also Table 5). Social entrepreneurship and

student entrepreneurship have also been discussed by a few authors (Apostu et al. 2022; Matei and Voica 2013; Secundo et al. 2021).

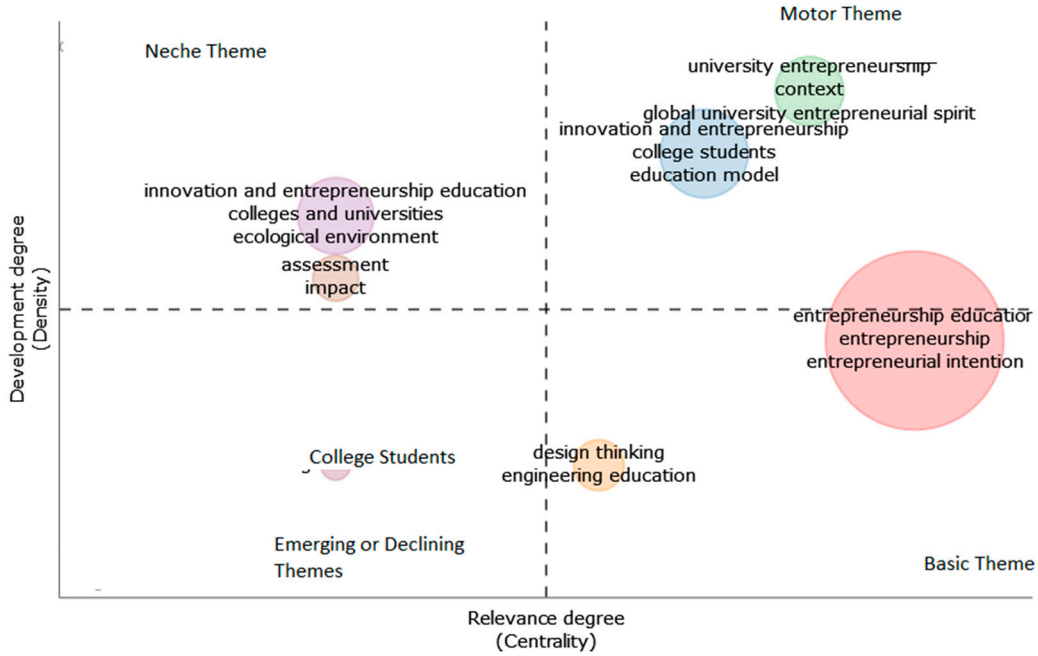


**Figure 6.** Thematic Map. Source: Constructed based on Biblioshiny Software.

**Table 5.** Frequency Analysis of Keywords.

| Words | Occurrences | Percentage of Occurrence |
|---|---|---|
| entrepreneurship education | 185 | 26.466 |
| entrepreneurship | 105 | 15.021 |
| entrepreneurial intention | 54 | 7.725 |
| education | 53 | 7.582 |
| entrepreneurial | 40 | 5.722 |
| higher education | 29 | 4.149 |
| university | 29 | 4.149 |
| entrepreneurial university | 24 | 3.433 |
| innovation | 24 | 3.433 |
| entrepreneurial education | 22 | 3.147 |
| students | 20 | 2.861 |
| universities | 19 | 2.718 |
| entrepreneurial intentions | 15 | 2.146 |
| entrepreneurial self-efficacy | 13 | 1.860 |
| intention | 13 | 1.860 |
| self-efficacy | 13 | 1.860 |
| gender | 12 | 1.717 |
| social entrepreneurship | 10 | 1.431 |
| student entrepreneurship | 10 | 1.431 |

Figure 6 exhibits the thematic map related to entrepreneurship education at universities. It provides a pictorial presentation of the trending themes in this area of research.

bottom-right part of the map shows the basic themes representing the well-established research issues in this area. The main themes are entrepreneurship education, entrepreneurship, and entrepreneurial intention, which will be discussed jointly. In addition, engineering education considers design thinking, which affects entrepreneurial education. The themes gaining importance in the recent past are presented in the top-right part of the map. They mainly include two research issues: university entrepreneurship and innovation and entrepreneurship. Keyword analysis also shows that significantly less research has been done in these areas. It is important to discuss about global universities, which have to include models of education, innovation and entrepreneurship in research. College students and motivation can be considered as declining themes. The niche themes include innovation and entrepreneurship, ecological environment, non-linear models, and quality evaluation (Hoxhaj and Hysa 2015; Hysa and Foote 2022). Additionally, assessment and impact analysis also considered niche themes (Hysa and Rehman 2019). Entrepreneurship education at universities is analyzed throughout the research process using a thematic evolution map, and the theme's course through evolution is determined by looking at the evolution trend (Figure 7). Comparing the evolutionary path map to the evolutionary state of each era reveals that land degradation research is still in its formative stages; it has not yet reached its full potential. There is clear evidence of differentiation, integration, transfer, and regeneration of themes, as demonstrated by the wide range of study themes across periods and the complexity of thematic evolution interactions. Evolutionary change is a highly unpredictable process. Since this study's inception, sixteen different evolutionary lines have emerged from two distinct origins.

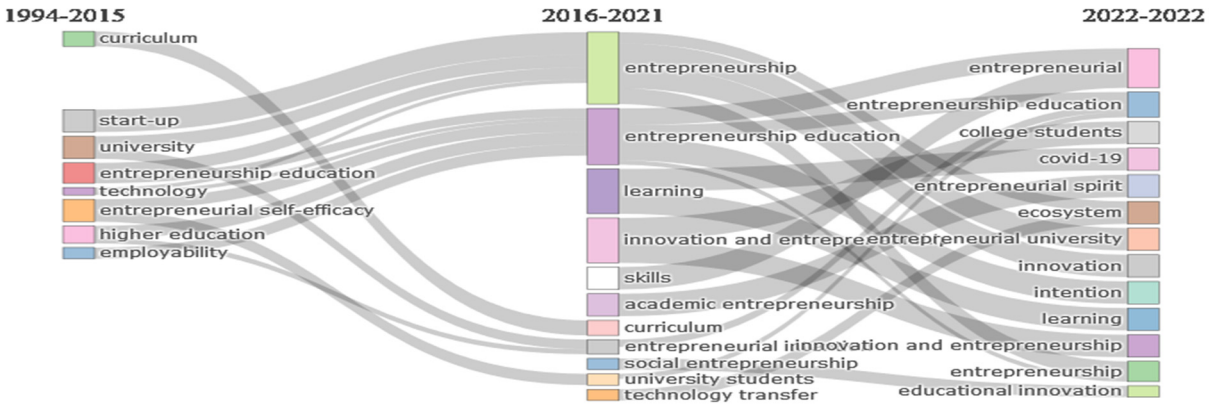


**Figure 7.** Thematic Evolution. Source: Constructed based on Biblioshiny Software.

The education research curriculum aspect in entrepreneurship started to be discussed with 1994. In fact, from 1994 to 2016, business startups were discussed, analyzed and researched, while from 2016 to 2021 the concept of entrepreneurship was elaborated and developed, under multiple aspects (including education). Starting with 2021, topics related to entrepreneurial universities were mentioned more and more often. The subjects or themes related to entrepreneurship proposed and discussed in the period 1994–2016 were modified by approaches in 2021 when they were massively integrated in the education sector, especially in universities (under the concept of entrepreneurial universities). If starting with 1994 we were discussing entrepreneurial self-efficacy, in 2016 the major theme related to entrepreneurship started to be entrepreneurial education. In the last years the discussions related to graduate people moved from employability to generate skills for the entrepreneurship (Hysa and Mansi 2020). On the other hand, the approach initiated in 2016 under the name of social entrepreneurship has in mind especially educational innovation and the new ecosystem structure, in the light of the new global challenges.

### *3.6. Qualitative Analysis of Highly Cited Articles*

This section reviews the 10 highly cited articles related to entrepreneurship education at universities explained in chronological order. Table A1 in the Appendix A included the information related to the highly cited papers. Gartner and Vesper (1994) conducted a longitudinal survey conducted over 20 years and found a plethora of interactions between all of the different aspects of an entrepreneurship course when conducting a pedagogical experiment, such that modifications to one aspect of a course influence and are influenced by modifications to other aspects. In addition, this study assists readers who are attempting new things in their entrepreneurship classes to make an effort to understand the contextual factors that may determine the ultimate success or failure of their ventures.

In addition, In the latter part of 1994, a mail survey was conducted by Vesper and Gartner (1997). Over 940 business school presidents in the United States, 42 in Canada, and 270 elsewhere in the world were asked to fill out this survey. Course availability, faculty publications, community impact, alumni accomplishments, innovations, alumni start-ups, and scholarly outreach were cited as the top seven criteria for ranking entrepreneurship programs. In the programs surveyed, students could take classes on topics including "entrepreneurship or starting new firms", "small business management", "field projects/venture consulting", "starting and running a firm", "venture plan writing", and "venture finance", among others. This study suggests that the Malcolm Baldrige National Quality Award (MBNQA) evaluation is a comprehensive and robust method. In addition, this study suggests that more debate and dialogue among academics, administrators, students, and other stakeholders must be encouraged to prepare criteria for evaluating entrepreneurship education at universities.

Specifically, Gibb (2002) examines the political necessity of fostering an "enterprise culture" in Europe, which is largely attributable to the need to boost international competitiveness. Following this analysis of the educational response, several recent surveys are used to review some of the most pressing concerns surrounding the growth of entrepreneurship education at universities across the United Kingdom and Europe. The second section makes some attempts to address the imperative conceptually. The degree of uncertainty and complexity in the task and broader environment, as well as the desire of an individual in search of an opportunity or problem solution, are thought to play a role in inspiring entrepreneurial behaviour.

Amidst this massive growth, the obstacle of full academic legitimacy for entrepreneurship persists (Kuratko 2005). There is a case to be made that entrepreneurship education has finally arrived at a level of legitimacy, but significant obstacles remain. Entrepreneurship is cutting-edge; it requires constant originality. It's the way of the future for MBA programs, so it needs to start taking the reins. Words like "dream", "create", "explore", "invent", "pioneer", and "imagine" are now commonly used to describe the new innovation regime of the 21st century. Teachers of entrepreneurship should demonstrate the same creative zeal as their students.

Moreover, Rasmussen and Sørheim (2006) detailed several action-based entrepreneurship education initiatives currently underway at five different Swedish universities. These examples demonstrate that entrepreneurship education places less emphasis on lecturing to isolated students and more on participatory learning in teams and online communities. Several programs aim to do more than one thing at once, such as teach aspiring businesspeople or launch innovative companies or make university research available to the public. Constructing an action-oriented entrepreneurship education program has implications for the future of the field.

To confirm (or disprove) the common belief that entrepreneurship education increases the intention to start a business, Sánchez's (2013) study aims to highlight the crucial role played by an EE program on the entrepreneurial competencies and intentions of secondary school students. We adopted a quasi-experimental design consisting of a series of tests taken before and after the intervention. The findings corroborate our hypotheses, showing that students in the "experimental" group improved their skills and motivation for self-

employment, while students in the "control" group did not. The results add to the literature on EE and the theory of planned behaviour by illuminating the impact of the program's individual benefits on the students.

Afterwards, Zhang et al. (2014) use the Entrepreneurial Cognition Theory, Ajzen's Theory of Planned Behavior, the Shapero Entrepreneurial Event Model, and previous research on entrepreneurship education, exposure, perceived desirability, and feasibility to examine the relationship between these variables and university students' entrepreneurial intentions (EI). Our sample size was 10 universities, and we were able to collect 494 valid responses. Using probit estimation, we found that people's opinions of a thing's desirability have a substantial effect on EI, while people's opinions of a thing's feasibility have none. While it may come as a surprise, exposure has a major negative effect, while entrepreneurship education has a major positive one. Higher levels of EI can be found among males and those educated at technologically focused institutions or who come from technologically focused backgrounds. In addition, the correlation between entrepreneurship education and EI is significantly strengthened by the positive interactive effects of gender, institution type, and field of study.

Moreover, Saeed et al. (2015) proposed and tested an integrative, multi-perspective framework. We have hypothesized that the three dimensions of university support, that is, perceived educational support, concept development support, and business development support, together with institutional support, shape students' entrepreneurial self-efficacy. In turn, entrepreneurial self-efficacy and individual motivations constitute the fundamental elements of the intention to start a business. A sample of 805 university students took part in the study and data were analyzed using structural equation modelling. Our findings showed that perceived educational support exerted the highest influence on entrepreneurial self-efficacy, followed by concept development support, business development support, and institutional support. Self-efficacy in turn had a significant effect on entrepreneurial intention. Individual motivations such as self-realization, recognition, and role had an additional impact on intention. However, the intention was not related to financial success, innovation, and independence. The findings suggest that a holistic perspective provides a more meaningful understanding of the role of perceived university support in the formation of students' entrepreneurial intention.

Karimi et al. (2016) used a pre-and post-survey to compare the effects of required and elective entrepreneurship education programs (EEPs) on students' entrepreneurial motivation and ability to spot new business prospects, drawing on insights from the theory of planned behaviour. In total, 205 students from six different Iranian universities filled out the questionnaires used to collect the data. In both types of EEPs, students reported significant improvements in their subjective norms and perceived behavioural control. The results also showed that the entrepreneurial aspirations of students were significantly raised by the elective EEPs but not by the required EEPs. This research adds to our understanding of planned behaviour and may influence how EEPs are developed and delivered.

Importantly, Wright et al. (2017) constructed an eco-system framework to start-ups by university students. This framework takes into account the following factors: the nature of the university environment and the external context; the involvement of different types of entrepreneurs, support actors, and investors; the evolution of these factors over time; and university mechanisms to facilitate student entrepreneurship, including a continuum of involvement from pre-accelerators through accelerators. Methods of financial support are also discussed.

## 4. Discussion

According to the bibliometric analysis using quantitative and qualitative analysis of highly cited documents, the following research gaps and future recommendations can be identified. Overall, researches on entrepreneurship education at universities is still in its early phases, as seen by the extant pieces of literature, and future studies should focus on expanding on the following fronts:

1. It is better to research the relationship between innovation and entrepreneurship education at universities and entrepreneurship performance in detail for future researchers (Hernández-Sánchez et al. 2019). Accordingly, questionnaires and in-depth interviews can explore using quantitative and qualitative research. Previous scholars consider intellectual property and partnership, but no model has been constructed to examine this relationship (Schmitz et al. 2017).
2. In addition, entrepreneurship education and intention should be tested longitudinally by studying university students whose knowledge must be verified at the level of each program and study cycle (Sherkat and Chenari 2020; Pascucci et al. 2022). In particular, it is better to conduct studies in different academic programs at universities (Management, Engineering, Arts, etc.) and to different levels of students. Moreover, conducting cross-country studies with questionnaire surveys on these themes is better integrated with in-depth interviews.
3. Moreover, spirituality and entrepreneurship education have not been examined in detail in the existing literature. Combining the spirit with the entrepreneurial skills aims at a behavioral and attitudinal transformation in order to generate sustainable businesses. It is essential to consider the human values in entrepreneurship, including mindfulness, compassion, a meaningful life, and a sense of community. Universities should consider the spiritual values incorporated in their curriculum. Spirituality can be considered a moderator in the relationship between entrepreneurship education and entrepreneurship or mediation between entrepreneurship education and entrepreneurship. Nevertheless, no study has been conducted with comprehensive surveys or mixed approaches. It is better to conduct a sequential exploratory study to examine this relationship.
4. Entrepreneurship education and the sustainability of entrepreneurs is also a topic that needs more investigation in the future (Pascucci et al. 2021). There is a need to consider how the required sustainability practices introduced by the universities in their curriculum can improve the sustainability of entrepreneurs. It is better to conduct case studies, in-depth interviews, and mixed-method research in different countries and contexts.
5. A university-based entrepreneurial education ecosystem (Liu et al. 2021) has been elaborated upon, but only considered the views of university executives to build the model. It is better to consider future researchers to obtain stakeholder opinions, including students, government, industry, and communities, to expand the model to evaluation. This model can be tested using case studies, in-depth interviews, and mixed-method research in different countries and contexts.

## 5. Conclusions

Pieces of literature in the field of entrepreneurial education were retrieved from the Web of Science database for 1994–2022 and then analyzed with the help of the Biblioshiny software package. The study of entrepreneurial education at universities displays the following traits and methodological rigor (Rejeb et al. 2022):

(1) The first research question is analyzed using trend analysis by observing the changes of publications from the period of 1994 to 2022. According to an analysis of publication patterns, the number of published works addressing entrepreneurial education at universities has been steadily increasing since 2004. The first part of the analysis related to the first research question had three distinct phases: the initial, low publication stage; the intermediate, sprouting stage and the expansive, higher publication stage. According to citation counts, research into entrepreneurship education saw the most growth between 2014 to 2022. The number of people concerned about entrepreneurship education at universities and the number of academics working on this issue has grown over time.

(2) The second research question analyzed the use of the number of publications and citations per author. Accordingly, the highest cited author is Kuratko DF, who is The

Jack M. Gill Distinguished Chair of Entrepreneurship attached to Indiana University, USA. The second most highly cited author was Professor Allan Gibb who is attached to Durham University in the UK.

(3) The third research question was analysed using the number of publications and citations per journal. Accordingly, highly cited journals including *Entrepreneurship Theory and Practice*, and *The Journal of Small Business Management* are Q1 journals. Therefore, future scholars should direct their publications to these journals to receive a greater number of citations.

(4) The fourth research question was analyzed using the number of publications but also the citations of the authors assigned to their countries. In this regard, China has more clout in the field of research in recent years than most countries in the world, with the possible exception of the USA and Great Britain. As a major developed nation, the United Kingdom also has significant research conducted in this area. An analysis of published works reveals infrequent international collaboration and a preponderance of solo research efforts. While scientific research is becoming increasingly globalized, this trend is counterproductive.

(5) The fifth research question was analysed using the critical review of highly cited papers related to entrepreneurship education at universities. These studies considered the evaluation of entrepreneurship education, entrepreneurship culture, action-based entrepreneurship education, entrepreneurial intention and university support, the effectiveness of entrepreneurship education and eco-system framework to start-ups by university students.

(6) The sixth research question was analysed using word clouds and thematic maps. The most frequently used keywords are entrepreneurial education, entrepreneurship, and entrepreneurship intention. A thematic analysis was conducted and identified future research implications.

(7) The final question suggests future research areas to be considered by researchers including innovation and entrepreneurship, entrepreneurial education and intention, spirituality and entrepreneurship education, entrepreneurial education and sustainability, and entrepreneurial eco-systems using comprehensive (mixed, longitudinal) studies.

These findings from the synthesis improve our familiarity with entrepreneurship education with regard to universities' research and trends, but there are still some gaps in our knowledge that need to be filled by additional research. Our analysis does not specifically investigate the factors related to the longitudinal shifts in the choice of topics, co-authorships, and journal citations that are indicated by our study, nor do we delve into the causes that accelerated the rise in entrepreneurship education-related publications. Other researchers can investigate the causes behind shifts and conduct analyses on co-citations and bibliographic coupling.

Only articles published in journals with strict peer review were included in this study. Therefore, other sources of information, such as entrepreneurship education-related conference proceedings, books, and chapters were not.

Our reliance on the Web of Science database alone was also a weakness. While the Web of Science is the best place to find bibliometric-related articles, we may have missed some important ones by focusing on this database exclusively (Rejeb et al. 2022). Future researchers can consider SCOPUS, a Google Scholar database, for data collection. On the other hand, focusing on only English-language articles may have overlooked significant contributions from publications and networks that employ other languages.

In addition, we avoided studying qualitative indicators in favour of focusing exclusively on quantitative ones in this study. Including qualitative indicators in the future can open up new avenues of inquiry and shed light on previously unknown phenomena. Journal performance is measured by looking at how many times each article has been cited by other works (Rejeb et al. 2022). Therefore, future research can rely on article-level metrics (Altmetrics) (according to Luc et al. 2021) and other journal performance indicators

that take entrepreneurship education mentions into account. More information about the strengths and weaknesses of a journal, as well as its relative reach, can be gleaned by utilizing alternative indicators (Bang et al. 2019).

Although we were able to successfully investigate and map entrepreneurship education-based global scholarly studies, our results did not identify the main drivers behind the explosive growth of this literature over time. As a result, we can move forward with studies that shed light on the driving forces behind entrepreneurship education research's rapid development.

Even with these limitations, this study contributes to the synthesis of the literature on entrepreneurship education at universities, which will be important for the research initiators and research scholars with regard to identifying trends and future research recommendations.

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## Appendix A

**Table A1.** Highly Cited Documents.

| Authors | Title of the Paper | Findings | Total Citations |
| --- | --- | --- | --- |
| Kuratko (2005) | The emergence of entrepreneurship education: development, trends, and challenges | Identifies issues and developments in 21st-century entrepreneurial education<br>Avoid paradigm paralysis<br>Entrepreneurship educators must have innovative drive<br>Consider about spirituality | 982 |
| Gibb (2002) | In pursuit of a new 'enterprise' and 'entrepreneurship' paradigm for learning: creative destruction, new values, new ways of doing things and new combinations of knowledge | If there is to be a sufficient response, it is necessary to apply the Schumpeterian idea of creative destruction to the higher education sector in order to find innovation (new ways of doing things) and new combinations of knowledge. | 434 |
| Rasmussen and Sørheim (2006) | Action-based entrepreneurship education | Entrepreneurship education places more of an emphasis on learning-by-doing activities in a network context than it does on teaching individuals in a traditional classroom setting.<br>Several programs aim to educate entrepreneurs, launch new businesses, and commercialize academic research, among other things. | 307 |
| Sánchez (2013) | The impact of an entrepreneurship education program on entrepreneurial competencies and intention | With a number of entrepreneurially related competencies and intentions, entrepreneurial education has positive and significant relationships. | 241 |
| Vesper and Gartner (1997) | Measuring progress in entrepreneurship education | The top seven criteria suggested for ranking entrepreneurship programs are:<br>- courses offered<br>- faculty publications<br>- impact on community<br>- alumni exploit<br>- innovations<br>- alumni start-ups, and<br>- outreach to scholars | 226 |

**Table A1.** *Cont.*

| Authors | Title of the Paper | Findings | Total Citations |
|---|---|---|---|
| Zhang et al. (2014) | The role of entrepreneurship education as a predictor of university students' entrepreneurial intention | Entrepreneurial intention (EI) is higher in men and people with technological backgrounds and/or universities than in women and people with other backgrounds and universities.<br>The relationship between entrepreneurship education and EI is also significantly influenced by<br>- the gender<br>- type of university, and<br>- study major. | 218 |
| Karimi et al. (2016) | The impact of entrepreneurship education: A study of iranian students' entrepreneurial intentions and opportunity identification | Entrepreneurial education programs had minimal effects on students' attitudes toward entrepreneurship and their perceptions of opportunity identification.<br>Entrepreneurship education programs significantly influenced subjective norms and perceived behavioral control. | 176 |
| Gartner and Vesper (1994) | Experiments in entrepreneurship education: successes and failures. | When conducting a pedagogical experiment, it appears that there are numerous interactions between every aspect of an entrepreneurship course, such that changes made to one aspect have an impact on, and are in turn influenced by, other aspects. | 143 |
| Saeed et al. (2015) | The role of perceived university support in the formation of students' entrepreneurial intention | A holistic viewpoint offers a more insightful understanding of the part that students' perceptions of university support play in the development of their entrepreneurial intentions. | |
| Wright et al. (2017) | An emerging ecosystem for student start-ups | Eco-system framework should include<br>- continuum of involvement from pre-accelerators to accelerators<br>- university mechanisms to support student entrepreneurship<br>- the participation of a range of entrepreneurs<br>- support actors, and investors,<br>- the unique characteristics of the university environment and<br>- the external context, and their evolution over time | |

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